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Remarks

1. Summary of Office Action

In the Office Action mailed September 20, 2006, the Examiner rejected claims 1-6 and 9-11 under 35 U.S.C. § 112, first paragraph, as not being enabled. Further, the Examiner rejected claims 1-5, 10-13, and 16-29 under 35 U.S.C. § 103(a) as being obvious over a combination of U.S. Patent No. 6,232,874 ("Murphy") and U.S. Patent Application Pub. No. 2002/0111738 ("Iwami"), the Examiner rejected claim 6 under 35 U.S.C. § 103(a) as being obvious over a combination of Murphy, Iwami, and U.S. Patent Application Pub. No. 2004/0088205 ("Geisler"), and the Examiner rejected claims 9 and 15 under 35 U.S.C. § 103(a) as being obvious over a combination of Murphy, Iwami, and William Cohen (ML 95 provided by Applicants).

2. Status of Claims

Applicants have amended claims 1-3, 6, 10, 12, 16, 17, and 25 to recite the invention more particularly and/or to correct minor errors. Support for these amendments may be found in Applicants' specification, e.g., on pages 9-14, paragraphs 0036-0060. Further, Applicants have cancelled claims 9 and 15.

Now pending in this application are claims 1-6, 10-13, and 16-29, of which claims 1, 12, and 25 are independent, and the remainder are dependent.

3. Response to §112 Rejections

As noted above, the Examiner rejected claims 1-6 and 9-11 for lack enablement. In this regard, the Examiner asserted that the limitation of "using one of a linear function of the sensor data, a non-linear function of the sensor data" was not described in the specification.

As now amended, independent claim 1 does not recite this limitation. Applicants thus believe that this amendment overcomes the 112 rejection with respect to claim 1 and also remaining dependent claims 2-6, 10, and 11 due to their dependency from claim 1.

4. Response to §103 Rejections

i. Claims 1-5, 10-13, and 16-29

As further noted above, claims 1-5, 10-13, and 16-29 were rejected on grounds of obviousness over a combination of Murphy and Iwami. Applicants respectfully traverse those rejections, because the cited combination of Murphy and Iwami fails to disclose or suggest all of

the limitations of any of these claims, as would be required to establish a *prima facie* case of obviousness under 35 U.S.C. § 103.

The claimed invention relates to a method and apparatus for classifying an activity state of a driver. In this regard, as now recited in independent claim 1 for instance, the claimed invention involves: (i) providing *a statistical classifier, the statistical classifier being at least one of a C4.5, a RIPPER and, a Quadratic classifier, and configuring the statistical classifier as an at least two-state activity classifier operable to recognize at least a first driving state corresponding to a maneuver activity and a second driving state corresponding to a non-maneuver activity*, (ii) receiving sensor data relating to at least one vehicle operating condition, (iii) classifying the driver activity *using the configured statistical classifier* into one of the at least first and second driving states based upon the sensor data, and (iv) utilizing the classified state of the at least first and second driving states to determine whether to send an event to the driver of the vehicle. (Emphasis added). (Dependent claims 2-5, 10, and 11 necessarily include these limitations by virtue of their dependence from claim 1).

Independent claims 12 and 25 also recite similar limitations. For example, claim 12 now recites a two-state classification apparatus for classifying an activity state of a driver, comprising: (i) an input for receiving sensor data relating to at least one vehicle condition, and (ii) a processor coupled to the input, wherein the processor analyzes the sensor data to determine a classification of the activity state of the driver using a statistical classifier, *wherein the statistical classifier used by the processor is at least one of a C4.5, a RIPPER, and a Quadratic classifier that is configured as an at least two-state activity classifier operable to recognize at least a first driving state corresponding to a maneuver activity and a second driving state corresponding to a non-maneuver activity, and wherein the processor determines the classification of the activity state of the driver using the statistical classifier as one of a maneuver or non-maneuver* and utilizes the classification of the activity state to determine whether to send an event to the driver of the vehicle. (Emphasis added). (Dependent claims 13 and 16-24 necessarily include these limitations by virtue of their dependence from claim 12).

Similarly, independent claim 25 now recites a vehicle arranged and constructed to use a classification of an activity state of a driver, comprising (i) a classification apparatus using a statistical classifier for providing a signal corresponding to one of a maneuver and non-maneuver, *wherein the statistical classifier used by the apparatus is at least one of a C4.5, a*

RIPPER, and a Quadratic classifier that is configured as an at least two-state activity classifier operable to recognize at least a first driving state corresponding to a maneuver activity and a second driving state corresponding to a non-maneuver activity, the signal being based on sensor data related to at least one operational condition, and (ii) a device operable to use the signal for determining a timing for sending the driver an event. (Emphasis added). (Dependent claims 26-29 necessarily include these limitations by virtue of their dependence from claim 25).

To the extent Murphy and Iwami references relate to vehicle systems and methods, these references fail to explicitly disclose or suggest the particular limitations presently recited in Applicants' claims. For example, Murphy and Iwami fail to disclose or suggest the particular limitations of: (i) providing a statistical classifier, the statistical classifier being at least one of a C4.5, a RIPPER, and a Quadratic classifier, and configuring the statistical classifier as an at least two-state activity classifier operable to recognize at least a first driving state corresponding to a maneuver activity and a second driving state corresponding to a non-maneuver activity, and (ii) classifying the driver activity using the configured statistical classifier into one of the at least first and second driving states based upon the sensor data, as recited in claim 1 for instance. As noted above, similar limitations are also found in Applicants' other independent claims, now amended herein.

Because the cited combination of Murphy and Iwami fails to disclose or suggest all of the limitations of any of claims 1-5, 10-13, and 16-29, the cited combination fails to render these claims obvious under 35 U.S.C. § 103.

Further, Applicants respectfully submit that other cited art, separately or in combination with Murphy and Iwami, also fails to disclose or suggest at least the limitations noted above.

At best, William Cohen (ML 95), cited by the Examiner with respect to claims 9 and 15 (now cancelled), *generally* relates to machine learning systems and proposes an improved IREP algorithm (RIPPER*k*) to achieve better error rates (e.g., comparable to those of C4.5 algorithm) when used with large datasets.

However, aside from these general teachings related to machine learning systems, Applicants do not find in Cohen any *specific* disclosure or suggestion for using a statistical classifier, such as a C4.5, a RIPPER, and/or a Quadratic classifier, in the manner presently claimed by Applicants. For instance, Cohen fails to specifically disclose or suggest: configuring a statistical classifier that is a C4.5, a RIPPER and/or a Quadratic classifier as an at least

two-state activity classifier operable to recognize at least a first driving state corresponding to a maneuver activity and a second driving state corresponding to a non-maneuver activity, and further, using such configured statistical classifier to determine a classification of an activity state of a driver as a maneuver or non-maneuver.

To illustrate, Applicants' specification describes how different statistical classifiers, including the RIPPER described in Cohen (*see* par. 0042), may be configured for use in driving state recognition and maneuver/non-maneuver classification. In one example embodiment, a driving simulator may be used to collect data across a number of drivers under various driving conditions. This collected data may be then used to train a C4.5, a RIPPER and/or a Quadratic classifier appropriately to recognize maneuver and non-maneuver states. For instance, in the case of a Quadratic classifier, the classifier may be configured such that a positive value of the classifier output would indicate a maneuver activity (*see, e.g.*, par. 0043-0045 for more details).

The specification further describes how given classifier parameters may be configured to optimize the classifier's performance in detecting maneuver and non-maneuver states. For example, in the case of a Quadratic classifier, the optimum value for a regularization coefficient may be determined through driver-independent cross-validation experiments. As another example, in the case of a C4.5 classifier, the optimal number of allowed training instances in a leaf may also be determined using cross-validation. An example of a C4.5 decision tree that may be generated using the optimal parameter settings is provided (*see*, par. 0052-0057).

Applicants respectfully submit that William Cohen, separately or in combination with other cited art, fails to provide any teaching or suggestion for Applicants' claimed invention, as now recited in the claims and illustrated by way of examples above.

ii. Claim 6

The Examiner further rejected claim 6 on grounds of obviousness over a combination of Murphy, Iwami, and Geisler.

Claim 6 depends from independent claim 1 and therefore necessarily incorporates all of the elements of claim 1. As discussed above, the combination of Murphy and Iwami fails to disclose or suggest the invention as recited in claim 1. Therefore, this combination also fails to disclose or suggest the invention as recited in claim 6. Further, Geisler fails to make up for the deficiencies of Murphy and Iwami discussed above.

Applicants do not concede that the remarks made by the Examiner with respect to claim 6 are correct. However, Applicants respectfully submit that those points are moot in view of the fact that Murphy and Iwami fail to disclose or suggest the invention as recited in independent claim 1.

iii. Claims 9 and 15

The Examiner rejected claims 9 and 15 as being obvious over a combination of Murphy, Iwami, and William Cohen (ML 95). Applicants have cancelled claims 9 and 15, thus rendering the rejections of these claims moot.

5. Conclusion

In view of the foregoing, Applicants submit that pending claims 1-6, 10-13, and 16-29 are in condition for allowance. Therefore, Applicants respectfully request favorable reconsideration and allowance of those claims.

Respectfully submitted,

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